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Bee Culture.

BEE CULTURE need no longer be a precarious and empirical pursuit. Discoveries and improvements comparatively recent, have so elucidated its principles, that its processes can be more definitely regulated than those of almost any other branch of rural economy. Without being divested in the least of that attractiveness which, from the earliest periods of history, drew to it the attention alike of the humble cottager and the inquiring student—making it a subject of unflagging interest and unfailing enjoyment, it now claims additional regard from the fact that it can be so conducted as to become a source of certain and amply remunerating profit. It may be viewed, first, as a *science* having for its object the attainment of a correct knowledge of all that pertains to the life, habits and instincts of the honey bee; and, secondly, as a *practical art*, which regards all the attainments thus made and to be made, as the only reliable foundation of successful management.

The chief cause of the depressed condition of bee culture in general, is not to be traced to any want of attention to the subject. It is to be found rather in an inadequate knowledge of and erroneous opinions concerning the physiology and habits of the insect; in the defective or ill-adapted construction of the hives, however differing in form and material, in which it has been doomed to live and labor; and in an injudicious mode of treatment. This, more than aught else, has prevented bee culture from making progress commensurate with the time and attention devoted to it. Despite the most assiduous observation and study, the interior of the hive and the domestic economy of the colony, remained till recently, and still remain for the masses, a *mystery*. The

common beekeeper knew that he was the owner of a stock of bees; he knew also, if he knew much, that among them was a queen, and workers, and drones. But the peculiar functions of each kind or class, and their respective relations to each other were, and still are with most persons, matters of conjecture and dispute. Of the means, also, of properly directing the labors of a colony, of regulating its operations systematically, so as to secure desired ends, almost utter ignorance prevailed, and still prevails very generally. After the swarm was secured—whether with or without superstitious observances—the hive was placed on its stand, and the bees were allowed to prosecute their labors as best they might. If in peculiarly favorable seasons or locations, the stock happened to thrive satisfactorily, its owner was thought to have *luck*; but rarely had any one the vanity to claim success as the result of his management. And yet, duly allowing for the vicissitudes of seasons, certain and regular success does most essentially depend on *management*. An adequate knowledge of the nature, habits, and instincts of the insect having once been attained, and a thorough control of the operations of the colony secured by the use of properly-constructed hives, the business fairly and truly becomes a subject of mere management. The means of acquiring such knowledge have now been made accessible, and hence we were warranted in stating, as we did, that bee culture need no longer be a precarious pursuit, but should be one regulated by system. The accumulated discoveries made within the last fifteen years, combined with deductions from facts previously recorded, have totally revolutionized the business, placed it on a firm foundation, and given it an impetus which must cause it to advance and flourish. Having reached this stage of development, it claims a higher appreciation, and deserves

a more general diffusion than before. It can be successfully prosecuted to a large extent in almost every region of the temperate zone, and under almost any circumstances. It requires only a small amount of capital, and comparatively little room, and exacts so little time, that the ordinary intervals of leisure suffice. It may, indeed, be regarded as an agreeable relaxation from the severer toils of husbandry, the drudgery of mechanical occupation, or the worrying exactions of professional duty. It may furnish fit employment for the aged and the invalid.

But, in order to revive the business, to render it compensating, and to cause it to advance with steady pace, the establishment of a periodical paper, devoted to its interests, is highly important. In a country so extensive as this, where general Apiarian Conventions have not yet become customary, and beekeepers can seldom have personal intercourse with each other, a medium of communication, affording facilities for discussion and frequent interchange of opinions, is evidently needed. Such a medium, for those engaged in congenial pursuits, the "AMERICAN BEE JOURNAL" is intended to be; and such, with the aid and support of those for whose benefit it is specially intended, it may speedily become. It will serve, likewise, as a repository of whatever is, directly or collaterally, of practical value in this department of rural economy; and as a vehicle by which information can be readily, rapidly, and widely diffused, so that the early introduction of useful improvements may be secured. Such a periodical, will tend also to increase the number of apiarians, and thus make bee culture a business of more general importance, demonstrating, finally, that a vast and seemingly inexhaustible source of national wealth has hitherto been greatly neglected.

It is not proposed to give the Bee Journal a predominantly scientific cast. Aware that to be extensively useful, it must adapt itself to the wants of the community, it will constantly regard that object. Its contents must be diversified. Its columns must be accessible alike to the apiarian, whose experience and observations enable him to communicate information, and to the inquirer whose primary desire is to obtain instruction. But while aiming to render bee culture more popular, and foster its extension, the Bee Journal will endeavor to attract to it the attention of professed students of natural science, and such may be assured that it is a subject worthy of their powers. That which engaged the faculties of a Columella, an Aristotle and a Celsus, among the ancients, and of a Swammerdam, a Reaumur and a Huber, among the moderns, cannot certainly be devoid of attrac-

tion for an inquiring mind. It possesses fascination enough to engender even enthusiasm in its votaries, and much as has latterly been accomplished in the elucidation of obscure points, there remain mysteries enough to be explored and explained, to employ the most astute intellect. It is surprising, indeed, that the physiology and natural history of the honey bee have been made the subject of original investigation in so limited a degree by American naturalists. What has been done in that direction in this country, was done almost exclusively by men who commenced simply as apiarians; and nearly all that is to be found in treatises purely scientific, is a mere rehash from foreign publications substantially antiquated. This fact is not creditable to American genius; and now that a Leuckart, a Von Siebold, and a Dönhoff, in Germany, have set the example of renewed personal investigation, it is to be hoped that this inviting field will no longer be left unexplored by congenial minds here.

From the days of Aristotle to those of Swammerdam, (a period of nearly two thousand years,) little progress was made. The advance from the time of the latter to that of Huber was small, and thenceforward to the time of Gundelach, not much was added. With the annunciation, however, of Dzierzon's theory, a new era commenced; and though that theory encountered warm opposition, and excited a protracted controversy, it has triumphantly sustained itself, and led to further important discoveries. Hence the day cannot be distant when bee culture may, so far as the theory is involved, be regarded as having assumed an impregnable position.

In the earlier part of its career, the German Bienenzeitung had to contend with difficulties, such as will not have to be encountered here. Bee culture had long been a subject of general interest and study in Germany. Various theories had been framed, to explain the mysteries which its advocates recognized as existing; and the authors and adherents of these several theories, clung fondly to their preconceived notions, defending them oft with intemperate ardor. So long as it seemed conceded that any one of these theories might be true, and all of them were treated with equal deference, the Bienenzeitung moved along smoothly. But when Dzierzon advanced his new theory, though modestly submitting it at first in the form of an hypothesis, a different state of affairs ensued. The old schools felt intuitively that if this new doctrine be true, it involved the subversion and repudiation of all the subsisting theories. It was at once made an object of attack from all quarters; and a violent controversy, not

unmixed with acrimonious personalities, followed. Dzierzon defended his theory with great dialectic skill, for which his training and large experience in bee culture eminently qualified him. Then turning on his assailants, he exposed their fallacies and the inconsistency of their views, and arrayed against them the evidence of incontrovertible facts. Some of the old correspondents of the *Bienenzeitung* began to complain and remonstrate, and finally many of them withdrew. But the truth was rapidly making converts on every hand; and when Berlepsch, who had vauntingly denounced the new theory, proclaimed his conversion; and Kleine, Orttel, and other distinguished apiarians, became its advocates, a new and highly intelligent corps of contributors soon made amends for the defection. The impartial course of the *Bienenzeitung*, pending the controversy, was acknowledged; its policy vindicated; and, in its speciality, it now enjoys universal esteem. Difficulties like these, the *American Bee Journal* need scarcely apprehend. There are no cliques or parties here, advocating theories or systems which they cherish with the prejudice of paternal affection. Hence, though there may be differences of opinion, frank investigation will be acceptable to all, and intemperate zeal will hardly obtrude itself, with its unreasoning obstinacy.

In conducting this Journal, our aim will be to promote bee culture as a systematic practical pursuit, based on established principles and ascertained facts. In furtherance of this object, while we invite and will give scope to full and free, yet temperate and courteous discussion, we shall unreservedly, as occasion may require, express our own views and convictions—striving to place before the reader, the information requisite for intelligent judgment, on any topic that may claim attention or deserve notice.

We conceive that we have the means to render the *Bee Journal* both interesting and instructive; and our endeavor will be to make it not only a welcome visitor, but a valuable and reliable counsellor. It must, however, not be supposed that the paper is designed for those only who purpose engaging in bee culture on an extensive scale, and adopting the methods and processes so highly appreciated abroad. It contemplates more general usefulness, and will address itself with equal earnestness, to that much more numerous class, whose operations are necessarily restricted within narrower limits. The most certain means of securing progress, are to be found in that which will enable common bee keepers, who still use only the simple straw, to prosecute the business with due success and satisfaction—thus inducing

them finally to join in the march of improvement. Hence, all, and such especially, are invited to communicate with us freely, stating any difficulties they may have to encounter, or any vexations they may experience in this pursuit; giving us an account of their own peculiar methods and manipulations; or relating whatever of new or strange, in this department, comes under their notice—their joys and sorrows, as apiarians; their successes as well as mishaps.

Our desire is, of course, that beekeepers, generally, would become readers and correspondents of the *Journal*; and that each should regard it, for himself, as a medium of imparting, as well as of receiving information. We ask them to send us their queries, their suggestions, their remarks, and their criticisms, as well as the results of their reflections and experiments. Let them here record their observations, and relate their experience; and much that is valuable cannot fail to be elicited for the general benefit. Let them derive a heat from their favorite insect, which by concord and co-operative industry, insures the prosperity of the colony.

THE HORNET. (*Vespa Crabro.*)

The hornet has ever been regarded as an inveterate enemy of bees. There are probably few observant beekeepers who have not seen them about the hives, suddenly seizing some luckless individual, clipping off the wings, and carrying away the body as a tid-bit for their brood. It has also been alleged that hornets have a special predilection for queen bees, and will even hunt and manage to seize them in the cluster, just after a swarm has settled. Till recently, however, I did not regard their hostility as in any respect of much consequence; but as they happened to be unusually numerous last season, I learned to know them better. I am now convinced that the hornet is to be classed amongst the most formidable enemies of bees, since, relying on its superior strength, it will boldly enter the weaker colonies, and occasionally, by robbery and murder, effect their destruction. Let me state some facts:

On a fine day last summer, I was standing near a small artificial colony, to which an Italian queen had been given several weeks previous. I watched it closely to see whether any young bees would issue. While thus engaged, I observed a hornet alight and enter the hive without the least hesitation. I immediately prepared myself to kill her when she reappeared; but as she remained in the hive more than five minutes, my vigilance became relaxed, and she succeeded in making her escape. I perceived, indeed, as she flew away, that she

was bearing off a bee, but did not then consider the circumstance as of any special importance. Studying to devise some mode of preventing such depredations in the future, I walked away, and returning in about half an hour, I found the entire population in commotion, exhibiting the clearest symptoms of queenlessness. I immediately opened the hive, and found that such was in fact the condition of the colony. Though I cannot say positively that I saw the hornet carry off the queen, I have not the least doubt that she did.

A few days later I again saw a hornet enter one of my hives, which contained a very weak *cast*, or third swarm, the queen of which was lost on her hymeneal trip. I had inserted a sealed royal cell, and the queen which emerged from it, returned safely from her excursion, to meet the drones, and was already fertile. Not valuing the colony very highly, I concluded to let the hornet continue her forays, and saw her frequently enter and depart. The colony soon proved to be queenless, the population decreased rapidly, and in the course of a week, the hornet ceased to repeat her visits. I now opened the hive, and took out the combs. There was not a bee to be seen, no brood, nor a trace of honey. The destruction of this colony, I attribute wholly to the depredations committed by the hornet.

I never yet saw a hornet enter the hive of a strong colony; and it might not be safe for her to attempt it. But many weak colonies have doubtless been made queenless in this manner, while the true cause remained wholly unsuspected.—KLEINE.

DWARF BEES.

In August, 1856, two of my small artificial colonies produced a large number of dwarf bees, scarcely larger than the smallest house-flies. Four of them hardly equalled an ordinary worker in bulk. It was amusing to see these Lilliputian creatures sporting with equal zeal and zest among their full-sized mates, and laughable to see them returning to their hives with miniature pellets of pollen on their thighs, or darting forth with the fierceness of pent-up wrath, to repel the assaults of robbers. The sting inflicted by them was very painful. There were several thousands of them, and the greater part lived till winter set in. On examination, it was found that they had originated in a comb which had been broken off and slipped down between two others, so as to rest on the bottom of the hive. A large number of the cells were much compressed laterally, and hence, doubtless, the diminutive size of the workers which were reared in them.—LUBINIECKE.

SINGULAR OCCURRENCE.

A populous and well stored hive belonging to one of my neighbors, swarmed on the 14th of July, 1855. It sent off three distinct swarms in quick succession, and these had clustered separately on a tree, when I arrived at the scene. On asking from which hive they had issued, one marked No. 3, was pointed out. As I saw no bees at its entrance, I turned it up and found it completely deserted. While an effort was being made to hive the two smaller swarms, they rose and united with the larger; and in attempting to shake this down, the whole body rose in violent agitation, whirled around with great noise, and then suddenly returned *en masse* to the hive they had deserted, entered it and speedily became quiet. Under the places where the two small swarms had settled, two dead queens were shortly after found.—PESENBECK.

From Burton's "Lake Regions of Central Africa."

The country abounds with honey. Near the villages log-hives hang from every tall and shady tree. Bees also swarm in the jungles. Their produce is of two kinds—one found in the forests and stored in grounds, resembles European wasp-honey; it is more than half filled with dirt, and affords little wax; the liquid is thin and watery, and has a singularly unpleasant flavor. The other variety is hive-honey, which is very good if not kept too long, and supplies a yellow wax, which is used by the Arabs to mix with tallow in the manufacture of candles. Honey is the only sweetener in the country, except in the maritime and lake regions, where the sugar cane grows. The natives chew the sugar cane, without knowing the art of extracting the juice.

A DWARF QUEEN.

On the 28th of April, 1856, I made my second artificial colony of Italian bees. The queen reared by it, and which left her cell on the 16th of May, was so diminutive that she could scarcely be distinguished from the workers. Intending at first to discard her, I finally concluded to let her remain till I saw whether she would become fertile. Four weeks had elapsed before I found eggs in the cells, and singularly enough most of them were attached to the sides of the cells instead of the bottoms; and it seemed as though they had been dropped involuntarily, as she withdrew her abdomen from the cell. The few eggs regularly placed on the bottom of the cells hatched in due time, but the workers produced were very small. The eggs affixed to the sides of the cells did not hatch.—LIEBE.

The Dzierzon Theory.

We propose, on this occasion, to present to the reader, in the form of distinct propositions, the fundamental principles of Dzierzon's system of bee culture, as set forth by the Baron of Berlepsch, in his celebrated Apistical Letters; designing to furnish in the succeeding numbers of this Journal, a condensed statement of the facts and arguments by which these propositions are demonstrated. We do this because, though that theory is frequently spoken of, and some of its leading features are probably known, no detailed account has hitherto been published in English. Yet, without an accurate and familiar acquaintance with it, the practice of bee culture cannot be conducted with the judgment and skill requisite to justify an expectation of successful results. The practical operations must be based on and adapted to the theory, which, hence, becomes a proper subject of study.

The propositions, as laid down by the Baron of Berlepsch, are as follows:

FIRST. A colony of bees in its normal condition, consists of three characteristically different kinds of individuals—the queen, workers, and (at certain periods) the drones.

SECOND. In the normal condition of a colony, the queen is the only perfect female present in the hive, and lays all the eggs found therein. These eggs are male and female. From the former proceed the drones; from the latter, if laid in narrow cells, proceed the workers or undeveloped females; and from them also, if laid in wider, acorn-shaped, and vertically suspended, so-called royal cells, lavishly supplied with a peculiar pabulum or jelly, proceed the queens.

THIRD. The queen possesses the ability to lay male or female eggs at pleasure, as the particular cells she is at any time supplying may require.

FOURTH. In order to become qualified to lay both male and female eggs, the queen must be fecundated by a drone or male bee.

FIFTH. The fecundation of the queen is always effected outside of the hive, in the open air, and while on the wing. Consequently, in order to become *fully* fertile, that is, capable of laying both male and female eggs, the queen must leave her hive at least once.

SIXTH. In the act of copulation the genitalia of the drone enter the vulva of the queen, and the drone simultaneously perishes.

SEVENTH. The fecundation of the queen, once accomplished, is efficacious during her life, or so long as she remains healthy and vigorous; and she never afterwards leaves the hive, except when issuing with a swarm.

EIGHTH. The ovary of the queen is not impregnated in copulation; but a small vesicle or sac situated near the termination of the oviduct, and communicating therewith, becomes charged with the semen of the drone.

NINTH. All eggs germinated in the ovary of the queen, tend to develop as males, and do develop as such, unless impregnated by the male sperm while passing the mouth of the seminal sac or spermatheca, when descending the oviduct. If they be thus impregnated in their downward passage (which impregnation the queen can effect or omit at pleasure) they develop as females.

TENTH. If a queen remains unfecundated, she ordinarily does not lay eggs. Still, exceptional cases do sometimes occur, and the eggs then laid produce drones only.

ELEVENTH. If, in consequence of superannuation, the contents of the spermatheca of a fecundated queen become exhausted; or if from enervation or accident, she lose the power of using the muscles connected with the spermatheca, so as to be unable to impregnate the passing egg, she will thenceforward lay drone eggs only.

TWELTH. As some unfecundated queens occasionally lay drone eggs, so also, in queenless colonies, no longer having the requisite means of rearing a queen, common workers are sometimes found, that lay eggs from which drones, and drones only, proceed. These workers are likewise unfecundated; and the eggs are uniformly laid by some individual bee, regarded more or less, by her companions as their queen.

THIRTEENTH. So long as a fertile queen is present in the hive, the bees do not tolerate a fertile worker. Nor do they tolerate one while cherishing a hope of being able to rear a queen. In rare instances, however, exceptional cases occur. Fertile workers are sometimes found in hives *immediately* after the death of the queen; and even in the presence of a young queen, *so long as she has not herself become fertile.*

These propositions, which embrace, substantially, the entire Dzierzon theory, are, in so far as they contain or propound anything novel, deduced from the personal observations and experiments of that celebrated apiarian. Several of them were warmly impugned by some of the ablest correspondents of the German *Bienenzeitung*. But Dzierzon alone, for a season, and the Baron of Berlepsch, the Rev. Mr. Kleine, and others, subsequently defended them with equal astuteness and vigor—adducing unquestionable facts in their support. The controversy was a very animated one; nor was opposition silenced till, by the introduction of the Italian bee, the means

of conclusively determining the chief points at issue were furnished. The evidence thus supplied was so clear and decisive, that all serious opposition ceased, and the truth of the positions was conceded by all intelligent apiarians. Naturalists and physiologists, however, continued to discredit and reject some parts of the theory, because they contravened so directly their own long-cherished views and opinions. But even they were ultimately constrained to yield to the evidence, when the facts as ascertained by Professors Leuckart and Von Siebold, no longer left room for cavil or doubt.

CHINESE MODE OF TAKING HONEY.

During my sojourn in this place, I had an opportunity of witnessing a novel mode of taking honey from bee-hives. The Chinese hive is a very rude affair, and looks very different to what we are accustomed to use in England; yet, I suspect, were the bees consulted in the matter, they would prefer the Chinese one to ours. It consists of a rough box, sometimes square, and sometimes cylindrical, with a movable top and bottom. When the bees are put into a hive of this description, it is rarely placed on or near the ground, as with us, but is raised eight or ten feet, and generally fixed under the projecting roof of a house or out-building. No doubt the Chinese have remarked the partiality which the insects have for places of this kind, when they choose quarters for themselves, and have taken a lesson from circumstance. My landlord, who had a number of hives, having determined one day to take some honey from two of them, a half-witted priest, who was famous for his prowess in such matters, was sent for to perform the operation. This man, in addition to his priestly duties, had charge of the buffaloes which were kept on the farm attached to the temple. He came round in high glee, evidently considering his qualifications of no ordinary kind for the operation he was about to perform. Curious to witness his method of proceeding with the business, I left some work with which I was busy, and followed him and the other priests and servants of the establishment to the place where the hives were fixed. The form of the hives, in this instance, was cylindrical; each was about three feet in height, and rather wider at the bottom than the top. When we reached the spot where the hives were placed, our operator jumped upon a table placed there for the purpose, and gently lifted down one of the hives, placing it on its side on the table. He then took the movable top off, and the honeycomb with which the hive was quite full, was exposed to our view. In the meantime an old priest having brought a large

basin, and everything being ready, our friend commenced to cut out the honeycomb with a knife made apparently for the purpose, having the handle almost at right angles with the blade. Having taken out about one-third of the contents of the hive, the top was put on again, and the hive elevated to its former position. The same operation was repeated with the second hive, and in a manner quite satisfactory. But it may be asked, "*Where were the bees all this time?*" and this is the most curious part of my story. They had not been killed by the fumes of brimstone, for it is contrary to the doctrines of the Buddhist creed to take away animal life; nor had they been stupefied with fungus, as is sometimes done at home—but they were flying about above our heads in great numbers, and yet, although we were not protected in the slightest degree, not one of us was stung; and this was the more remarkable, as the bodies of the operators and servants were completely naked from the middle upwards. The charm was a simple one; it lay in a few dry stems and leaves of a species of *Artemisia*, (wormwood,) which grows wild on these hills, and which is largely used to drive that pest, the mosquito, out of the dwellings of the people. This plant is cut early in summer, sun-dried, then twisted into bands, and it is ready for use. At the commencement of the operation, which I am describing, one end of the substance was ignited and kept burning slowly as the work went on. The poor bees did not seem to know what to make of it. They were perfectly good-tempered, and kept hovering about our heads, but being apparently quite incapable of doing us the slightest injury. When the hives were again properly fixed in their places, the charm was put out, and my host and his servants carried off the honey in triumph.—*Fortune's China.*

BEEES AND GRAPES.

I noticed last year, for the first time, that the bees eagerly visited my grapes when ripe, and felt willing to excuse their supposed depredations, because the previous spring and summer had been very unpropitious to their honey-gathering vocation. But, on more closely scrutinizing their proceedings, I found that in no instance did they attack sound fruit, even when perfectly ripe, but contented themselves with gleaning in the wake of more powerful marauders. I saw that they invariably alighted on such fruit only as had been pecked by birds or punctured by wasps and hornets. I never perceived a bee attempting to injure sound fruit. Those kinds of grapes which were not attacked by birds, wasps, or other insects, remained unvisited by the bees.—H. H. K.



The Worker Bee.

If we examine a hive in the months of May, June, or July—the busy season of the year, when the population has attained its fullest development—we shall find therein three distinct kinds of bees; a queen, a large number of drones, and many thousand workers. Later in the season, usually after the first of September, the population will be found to consist of the queen and workers exclusively, as drones are not then tolerated in healthy colonies.

It were superfluous to describe the worker bees minutely, as all who take an interest in the subject, have doubtless frequently observed them in the vicinity of the hive, or when gathering honey or pollen, from the flowers of the field.

They are not inappropriately called *workers*. Though the queen is by no means an idle or inactive inmate of the hive, and lays all the eggs from which the young bees spring, the workers perform all the other labors of the colony. They cleanse the interior of the dwelling, by removing thence all impurities; they close with propolis the cracks or crevices which might harbor worms or moths, or allow the escape of heat from within: they build the combs, nurse the brood, guard the hive, and provide all the honey, pollen, propolis and water needed in the economy, or essential to the prosperity of the colony.

Though each individual worker is or can become qualified to perform, in an emergency, all these several labors, yet ordinarily there is a subdivision of employment among them. Their duties may properly be classified under two heads—the internal or domestic, such as the production of wax, the building of comb, the nursing of brood, the capping of cells, and the garnering up of honey and pollen; and the external or foreign, such as the gathering of the substances and materials requisite for the support and welfare of the associated body. Those bees which attend to the domestic duties, rarely leave the hive except for exercise; whilst the others are almost constantly on the wing, “from morn to dewy eve,” gathering stores when such are to be found, and the weather permits them to go in quest of the coveted spoil. They scarcely take time to deposite their appropriated sweets in the destined receptacle, but hastily transferring them to the charge of their home-keeping sisters, they speed forth anew to forage the inviting fields

and sip the nectar of each expanded flower. He who fancies that the bee which has just returned from a successful excursion, applies its contributions of pollen or honey directly to their destined use, elaborating wax, building cells, or preparing chyme for the brood, entertains erroneous views. The gathering bees would, for the time, be almost wholly unfitted for such tasks as these. To prepare chyme, or secrete wax, the bees must previously consume a portion of pollen mixed with diluted honey, and then await, in the elevated temperature of the hive, the gradual processes of digestion and conversion. At such times their stomachs are so surcharged with these substances, that they are scarce able to fly, and they feel no disposition to sting. When, on opening the hive, other workers rush out, “on warlike deeds intent,” these retire timidly to the interior, and their entire deportment resembles that of the timid and fugaceous queen, whose more constant attendants they are. These “drudges of all work,” are the younger bees. On them, during their minority as it were, all the cares and toils of the home department are devolved; and for them as yet, the beauties of external nature have no attraction. Even honey, that coveted nectar, to appropriate which they will subsequently hazard life itself, is for them, at this early stage of existence, no enticing lure. The overweening fondness for it displayed at a later period, is with them literally an *acquired* taste. A bee just hatched will turn from it with decided unconcern, if not real disgust.

The older and far more numerous portion of the population are, in fair, mild weather, engaged from dawn to dusk in out-door pursuits, exploring the surrounding country in search of stores. The stomachs of these more actively employed bees, are nearly empty when they leave the hive, and their bodies are hence lighter and better fitted for rapid flight and distant excursions. Returning with laden thighs and well-gorged honey bags, their flight is obviously slower, and their motions more sluggish. At night, and sometimes during the day when the weather prevents them from going abroad, they hang in clusters from the combs; or if the heat within be great, they crowd about the entrance of the hive, and gather in masses on its front. When disturbed or annoyed, they do not, like the others, timidly retire, but at once assail the intruder intrepidly and repel him with their stings. But they rarely manifest any interest in the domestic concerns of the family; and if separately hived and deprived of their queen, they can scarcely be induced to rear a successor, to replace their lost sovereign, even when furnished with suitable brood. They

have, it is true, a home which they love and cherish—which they delight to replenish with nature's most luscious sweets, and for the defence of which, they are ever ready to sacrifice life itself; but it is a home swept and garnished for them by the *rising generation*, whose habits and instincts are, as yet, almost entirely dissimilar to theirs.

Who divides these workers thus into two distinct classes? Who orders this subdivision of their labors? Who inspires one portion with home-keeping propensities, and directs their attention to domestic duties; and impels the others to roam abroad for supplies and provide stores for autumn and winter? HE, who framed their bodies and infused their instincts. Their actions are not the results of reflection and choice, but of those innate impulses with which THE CREATOR has endowed them. What they do, they do unbidden, impelled thereto by an inborn industry actuated by different predilections, and assuming different tendencies at different stages of life, yet co-working, from first to last, for the common good. The younger, more delicate and more sensitive of atmospheric changes, attend by preference to the domestic employment; and as they advance in age, they pass gradually over into the rank of the elders, recruiting their diminished hosts, by supplying the place of the multitudes which daily perish. At first they come forth only during the warmer hours of the day, when the drones sally out, and young queens make their nuptial excursions. Subsequently they join the foraging parties, new propensities begin to be developed, their earlier habits are transformed, and instead of mainly creeping and crawling they now mount and fly. Though it would seem that to the aged bees, whose wings have become mutilated and whose bodies are toil-worn, the domestic duties might now properly be assigned, such is not the fact; and these precisely are the most indefatigable purveyors, the most sedulous laborers abroad, perishing ultimately, for the most part, from sheer inability to fly—owing to the lacerated condition of their wings.

A knowledge of this difference in the department of the workers, at different periods of life, is of much practical importance, because it can be advantageously availed of in many operations in bee culture. When, for example, a portion of the workers are to be transferred from a strong stock to an artificial colony, it would be highly injurious to the parent stock if the removed portion were composed mainly or altogether of old bees, which for the time constitute its most active and reliable *gathering force*. These, which would at all

events, not long survive, had better remain, and be allowed to labor on their old foraging ground, in their accustomed range or *beat*. Comb-building will, for some time, be the main business of the new colony, and for this department of labor, the old bees are comparatively valueless. The younger bees will answer better, and these besides, having for the most part never left the parent hive, will all the more readily adhere to their new home, wherever that may be placed. They will also turn their attention to honey gathering much sooner than they would have done, if they had not been removed. Hence the bees needed for such transfer, should be taken at a time when the workers are flying briskly and large numbers are engaged in foraging. Nor need it be apprehended that the brood in the parent hive will suffer, or any essential labor be neglected in consequence of such removal, though the larger portion of the workers be transferred. In a strong hive many more bees will still remain than are absolutely necessary. The work, also, which previously occupied the time and attention of perhaps twelve thousand bees, will now be easily performed by six thousand, laboring with redoubled zeal. The older bees among those transferred will also return to the parent hive, and the brood emerging from day to day will soon adequately replenish its population. Thus the equipoise will speedily be restored, or rather, the proportion of producers and consumers will be more suitably adjusted, for the smaller the number of bees by which the internal concerns of the hive are managed, the less will be the proportion of stores consumed and the more can be garnered up. When a pretty strong swarm is driven out of a populous hive and removed to a distant stand, scarcely any diminution of activity will be perceptible, if the parent hive be left on its old stand. The older bees, accustomed to foraging, will not confine themselves within, if pasturage abounds and the weather be favorable to their labors; and the younger portion, though greatly reduced in number, will still be able, by increased exertions, to nurse the larvæ, while the heat of the hive will suffice to mature the sealed brood. These younger bees, thus occupied with domestic duties, may easily be known by their somewhat lighter color and their perfect wings; but they may be still more readily distinguished in a hive of common bees, whose queen has been removed and replaced by an Italian queen. In about twenty days after the substitution, young Italian bees will begin to emerge; but another week will elapse before these will show themselves outside of the hive, and then at first only among those which, at about noon on

fine days, issue for exercise. If the hive be now opened, Italian workers will be found within, almost exclusively occupied in building and repairing combs, whilst the older or common bees are almost *en masse* abroad, engaged in foraging. But thenceforward, the number of Italian bees, participating in out-door labors, will increase from week to week, or rather from day to day; and the common bees will be continually decreasing in numbers, till in the course of three months they will have almost altogether disappeared. This process likewise furnishes the most convenient opportunity to ascertain the comparatively brief duration of the worker's life, because the period at which the old race becomes extinct, or has been entirely supplanted by the new, can thus be determined with much precision. It is, however, not a definite period, but occurs earlier or later, according to season and circumstances. If for instance, an Italian queen be substituted in September, the old race will probably not entirely disappear before the ensuing May or June. But if the substitution be made in June, scarcely an individual of the old race will be found in the hive after September, though during the first three weeks none but common bees emerge from the cells. For in the months of June, July and August, more workers are "used up" by incessant toil in their ordinary labors, thus exhausting their physical strength, than in the seven months succeeding. In autumn and winter they remain for the most part inactive, enjoying uninterrupted repose, after a protracted season of wearying toil; their bodily vigor, like that of the queen, which lays few eggs during this period, remains untaxed and unimpaired; and they may hence be said, not to grow older in the interval, though really advancing months in age.

The question—"How long may a worker live?" does not, consequently, admit of a precise and definite answer. Under favorable circumstances, as for instance, in a queenless colony, in which the bees, even in summer, are comparatively inactive, and may be said to *vegetate* rather than *live*, the worker might possibly survive for a year, unless perishing from accidental causes. Those bred in autumn usually live about nine months; whereas those bred in the spring rarely live more than three months. Hence we may assume six months as the fair average duration of the worker's life. In busy seasons the wings soon become lacerated and unfitted longer to subserve their proper functions, and the poor bee must then as certainly perish as any animal whose vital organs are diseased. When Baron Ehrenfels conjectured that if the worker escape the common casualties

and constantly recurring dangers to which it is necessarily exposed, it *might* live as long as a queen, he would have been right if he had simply added that such would be the case if the worker were a queen. A queen may undoubtedly be reared from any worker egg; but if the larva be reared as a worker it will have instincts correspondent to its mission, and the duration of its life will be determined by its habits and labors. Even the period of development is different in each, and is in each in the reverse order of the duration of life. The queen, attaining to much greater age, is perfectly developed in the brief term of sixteen days. The worker requires twenty-one days for its maturation, and yet, lives hardly as many months as the queen does years. The drone needs the still longer term of twenty-four days, and yet, is literally *cut off*, after a shorter existence than either of the others—many being doomed to premature destruction, as the last generation is frequently torn from its cells, as larvæ, and cast out of the hive. The habits and mode of life of the worker differ likewise essentially from those of the queen. The latter feeds only on pure honey, never like the workers consuming pollen in its crude state; and she never suffers from dysentery or foul-brood, even when the entire colony is affected by those diseases. Certainly, no reliable inference can be drawn as to the possible duration of the worker's life, from the actual age which queens are known to attain. If Baron Ehrenfels had enjoyed an opportunity to institute experiments with Italian bees, he would speedily have changed his opinion.

As it has been demonstrated for more than a century past, that a queen can be reared from any worker egg, it is certain that all the workers are originally of the female sex, though undeveloped, or rather checked or arrested in their development. Dissection has, moreover, shown that they possess mere rudimentary ovaries and scarcely a trace of a seminal sac or spermatheca. They are, consequently, physically unsusceptible of fecundation. In rare instances, however, some of them, from causes or influences not yet clearly ascertained, are enabled to lay eggs which produce drones only. These have been denominated *fertile* workers; and as they are commonly found only in queenless colonies, or in second swarms, it has been supposed that they may, while in their larva state, have received either accidentally or otherwise, a portion of the peculiar pabulum prepared for the larva reared as queens in royal cells. But this is mere conjecture. The fact, however, that their eggs produce drones only, shows that in their essential nature they resemble

the queens; as it is well ascertained that the eggs of unfecundated queens also produce drones exclusively, as will be shown hereafter.

The worker bee is provided with a sting, which is universally dreaded as a formidable weapon of offence. The mere fear of it suffices to deter many from engaging in bee culture; though this admirable insect is by no means so irritable and vindictive as it is generally supposed to be. It seldom or never stings without cause or provocation. Still its anger may easily be excited by improper treatment or rough usage. Rapid motion in front of the hive, obstructing the flight of departing or returning bees, breathing on them when clustered, and beating against their hive or its bottom board, are annoyances which excite their ire, and should be carefully avoided. Various odors, the natural exhalations of some persons, and the effluvium of their own poison when discharged, rouse their animosity and inflame their rage. Though they may usually be subdued by the use of smoke, such as is produced from rotten wood containing the larvæ of insects, it is exceedingly offensive to them, and should never be employed.

Nor are bees equally irritable at all times or seasons. In the cool of the morning, in the dusk of the evening, and during rainy weather, though they are not likely to become assailants, it is not advisable to undertake protracted operations among them, as they are more apt to become unmanageable when roused to full consciousness and life, from temporary repose. The foraging bees, also, being then *at home*, and more disposed to sting than the others, there is danger of having to encounter the ireful displays of a more numerous and fiercer host. When it becomes necessary to work among them, it is best to select noon, or the time of their busiest flight, for the operation, unless there is reason to apprehend that robbing-bees may be attracted to the scene. Every ebullition of anger, however slight, should be instantly repressed and subdued by the use of smoke, which, if properly employed, will keep them in subjection.

Bees are likewise peculiarly irritable and much disposed to sting, when their colony is queenless, or they are engaged in rearing queens. Interference with them at such times, especially if the brood-combs which contain the royal cells are disturbed, will excite their anger. The entire colony is, during such periods, in a state of comparative uneasiness, which culminates when the young queen is emerging from her cell, or making her nuptial excursion.

But the genuine apiarian must have no fear of the bee's sting, to which, moreover, his system

will soon become accustomed to such an extent that the infliction is rarely followed by unpleasant consequences. The speedy removal of the sting, and the frequent application of spittle to the wound, are all that is really needed in most cases. Some persons, indeed, are constitutionally liable to suffer greatly from the pain and inflammation. These should either avail themselves of the protection afforded by a bee-dress, or forego the pleasures of apiarian pursuits, unless they can procure a stock of the more peaceably disposed Italian bees.

LARGE DEPOSIT OF HONEY.

A somewhat singular discovery was made a few days ago, in the house occupied by Mrs. Gen. Wingate, on the corner of Spring and High streets, St. Louis. The *Argus* has the following account of the story:—"The inmates of one of our largest up-town mansion houses, a few days since were surprised to find a large number of bees flying about in two of the upper rooms. As the little fellows continued to occupy the places, a bee naturalist was sent to investigate the matter.—On entering the rooms, he exclaimed:—"You have honey somewhere here," and proceeded to search for it. On removing the fire-board, he discovered that one flue of the chimney was full of honey-comb; which was hanging down into the fire-place, and the honey dropping from it; proceeding to the top of the house to sound the chimney, he found it the same; one flue of the chimney was full, and the bees were industriously at work there also. These flues of the chimney had never been used; they were plastered smooth inside, and were perfectly dark, a stone having been placed on the top of each flue. The bees had descended the adjoining flues, and found small holes about ten inches from the top of the chimney, leading into the closed flues, and through these holes they had made their way in and out. They have, as is supposed, occupied these places for three years, having been kept warm in the winter by the heat from the adjoining flues. On removing the fire-board, the bees, seeing the great light which had broken in upon them, descended to the room and gathered on the windows, until they were covered to the thickness of three inches. It is estimated that there are in the two flues from 40,000 to 50,000 bees, and from two to three thousand pounds of honey."

"He may be regarded as a master in bee culture, who knows how to winter his stocks in a healthy condition, with the least loss of bees, the smallest consumption of stores, and with the combs unsoiled."

DEVELOPMENT OF THE WORKER EGG.

The eggs of the queen bee are ovoid-oblong in shape, and of a pearly-white color. They are laid in the cells of the comb by the queen, and attached to the bottom of the cell at their lower end, by means of a glutinous substance with which they are covered. They are hatched by the heat of the hive concentrated within the brooding space, by the bees clustered on the combs. The larvæ emerge from the eggs in the course of from forty to sixty hours after these are laid; the time being longer or shorter according to the temperature maintained in the hive. The emerged larvæ lie at the bottom of the cell, in a curved form, and are immediately fed by the workers, with a pellucid jelly, prepared in their chyle-stomachs by the digestion of honey and pollen mixed with water. The food is thus a finely edulcorated substance, which the larvæ can easily digest, and which they assimilate so perfectly that no excrementitious matter accumulates in the intestinal canal. This is an important provision, as the larvæ could not void feces till they reach their full development as insects.

The larvæ grow rapidly, and in six days attain such size as to be no longer able to lie in a curved form on the bottom of the cell, and now stretch themselves out lengthwise. As soon as this occurs, the workers close the mouth of the cell with a waxen cap or cover, performing the work with great celerity. As the larvæ are fed during six days, if we now assume that the queen lays, on the average, only 500 eggs per day, the workers have to provide food for 3000 larvæ daily. Eight days elapse from the time the egg is laid till the cell is capped. On the ninth day the larva is fully stretched out, and then begins to coat over the internal surface of the cell with a whitish gummy liquid, which rapidly dries and becomes glossy. She first gums over the inside of the cap or cover; then curving back the anterior portion of her body, she gums the upper half of the cylindrical cells, from front to rear, with the liquid, which issues from an orifice directly below her mouth. Her body becomes elongated and much attenuated, as her head moves onward towards the base of the cell, which point being reached, the head is directly over the tip of her tail, and she lies completely doubled up in her waxen prison. It is only by thus elongating and attenuating her body, that the larva becomes able to turn herself within her narrow cell, in order to gum the lower half likewise—proceeding now from rear to front. When her head has again reached the cap, she gradually turns her body again on its axis, and then lies stretched at length,

with head in front, and mouth downward, ready to undergo transformation to a nymph or chrysalis. Between the tenth and eleventh days the mandibles make their appearance in the chrysalis; on the twelfth day the head and thorax begin to protrude—though the head appears as if still infolded within the thorax, the latter being yet imperfectly developed. The insection between the thorax and the abdomen is scarcely perceptible; and the legs and wings are not yet visible. At the close of the thirteenth day, the insection between the thorax and the abdomen is perfectly formed; the legs, wings, antennæ and proboscis begin to make their appearance; and on the fifteenth day these are complete, though the wings are still small, and lie on the thorax in the direction of the first pair of legs, and are thus scarcely observable. In this stage of its advance, the insect is very soft, and perfectly white. On the sixteenth day, the several parts have become fully developed; the eyes begin to assume a brownish hue; and the proboscis lies extended under the thorax. On the seventeenth day the eyes become black, and the wings are almost fully unfolded. On the nineteenth day the insect is in all respects fully developed, though its color is still somewhat grayish; the proboscis is inclosed in its sheaths, but the abdomen remains infolded in the nymphal envelope. On the twenty-first day the bee is mature, its limbs have become firm, and the body has assumed a brownish hue; the nymphal envelope has been stripped off, and lies at the bottom of the cell, as a pellet about the size of a pin's head.

Thus, in the process of transformation, the anterior portion of the bee's body seems to *grow out of* the chrysalis, because the nymphal envelope remains nearly stationary, or seems rather to retrograde slightly, on the abdomen. The envelope itself, which is exceedingly thin, dries up on the abdomen of the bee, and is then pushed back by means of the feet and legs. When stripped off, it is so shrunken or compressed, as to form a scarcely visible pellet. On the twenty-first day the bee cuts through the cover of the cell with her mandibles, requiring about forty-five minutes for the operation, and then issues from her confinement. She first puts her wings in gentle motion, to give them their due shape and position, as they had necessarily been much compressed in the narrow cell. The hirsuties with which her head and thorax are covered, have still a grayish hue, by which the eye may readily distinguish recently hatched bees from their older companions, though they speedily become darker. The young bees do not immediately leave the hive, or engage in the gathering

of honey or pollen; but remain within about a week longer, employed first and principally in nursing the brood.

In very favorable weather the worker bees may emerge in twenty days from the time the eggs are laid; but ordinarily twenty-one days are required for the perfect development of the insect.—GUNDELACH.

STRUCTURE OF THE BEE'S CELL.

A patient consideration of the properties of the cube, and its position, has led Mr. C. M. Willich to the fact that the geometrical solid, formed by the union of two cubes, having a dodecahedron with twelve rhomboidal faces, produces angles affording the greatest amount of resistance.

The obtuse angle of the face of this dodecahedron, produced by the union of two cubes, as above-mentioned, is the prime angle which affords the greatest resistance to water pressure in a dock-gate.

The partition of another regular solid body, the tetrahedron, effected by cutting off from smaller tetrahedrons of half the length of the base, will leave the platonic or regular octahedron, whose eight faces are equilateral triangles—and these faces we find incline to each other at an angle of $109^{\circ} 28' 16''$, thus arriving at the same angle, although we make use of two very different simple solids—the cube and the tetrahedron. There are other curious interchanges, as in the partition of the dodecahedron, the trihedral summit forms one-fourth part of a tetrahedron.

The laws of nature are always simple. We might therefore be led to expect that the same angle which is the best for the dock-gates, should be precisely the same as that of the trihedral roof of the bee's cell. The mode of arriving at the angle of the bee's cell, Mr. Willich has shown in a letter inserted in *The Literary Gazette* of the 9th of July, explaining the manner of constructing the bee's cell, and of obtaining the angle required—and from which the following is an extract:

"I am now anxious to announce that I have succeeded in dividing the cube into several geometrical solids, with which many definite and regular geometrical bodies may be constructed.

Perhaps one of the most curious is that of the bee's cell, which is in fact an elongated dodecahedron, and consequently the angles of the trihedral roof and base, respecting which so many learned investigations have been made, can be no other than those of the true geometrical solid.

Without the aid of diagrams it is not easy to make the forms of solids clear to the mind in a popular way.

A cube may be divided into six equal and uniform bodies, in two different ways:

First.—By lines from the centre to the eight angles of the cube, which will give six four-sided pyramids.

Second.—By lines from one of the upper angles of the cube, drawn diagonally to the three opposite angles, dividing the cube into three equal and uniform solids. Each of these solids being halved forms a left and a right-handed solid. These six solids, though equal in solidity, differ so far in shape, as three are left-handed and three right-handed, in the same way as the hands of the human body.

Each of the six bodies obtained by the second mode of partition, may be divided into two of equal solidity and of similar shape. Two of these bodies, each being the one-twelfth of the cube, may be so united as to produce the pyramid obtained by the first mode of partition. Six of these bodies, each being one-twelfth part of the cube, may be so arranged as to form the oblique rhomboid.

For the present investigation we will not proceed further than the solid thus obtained, being the one-twelfth part of the cube. By this body, by using a different number and mode of arrangement, may be produced a variety of symmetrical geometrical forms in addition to the following:—

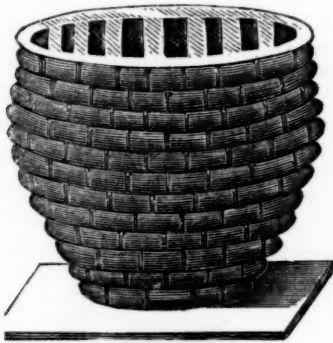
1. The cube consists of twelve of these bodies.
2. The octahedron consists of four of these bodies.
3. The oblique rhomboid consists of six of these bodies.
4. The dodecahedron consists of twenty-four of these bodies.
5. The dodecahedron also consists of four oblique rhomboids—or two cubes and six octahedrons.

The bee's cell consists of seven oblique rhomboids, or forty-two half pyramids. It is therefore evident that the bee's cell is an elongated dodecahedron.

It may be observed that the pyramid, or one-sixth of the cube obtained by the first mode of partition, may be divided into four bodies, each of which is one-third of a cube, containing one-eighth of the mass of the cube from which it was derived. So that, in fact, we may go on dividing and reproducing bodies of similar shape, and still retaining the diagonal lines of the cube. How far this subdivision may be carried in nature, or how much further than our powers of vision go, I will not at present venture an opinion. We can imagine that the commencing atoms may be infinitely small, when we remember the wonders revealed by the microscope."

Hives.

The beekeepers in the Greek Islands have from time immemorial used *bars*, adjusted across the tops of their hives, for the attachment and support of the combs. This may be considered as the earliest approximation to bee culture with movable combs. But, from what is known of their manipulations and processes, those beekeepers do not appear to have availed themselves in practice, of the facilities which even this slight improvement placed within their reach. Hives, with bars similarly arranged, have long been in use in Favignano, the "Blackwell's Island" of Sicily, and were probably introduced there from Greece. They are as clumsily constructed as those of the Greeks and used in the same inefficient manner. Christ, in Germany, and Golding, in England, constructed hives partially of this description, but seem to have regarded the bars

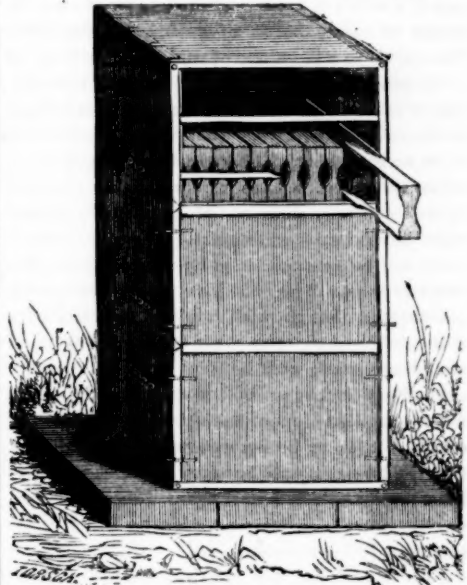


Improved Bar Hive.

as of only secondary importance—a mere convenience in the storifying system, of which both were strenuous advocates. Huber appears to have been the first who had a glimpse of other and more important advantages which might be derived from such an arrangement, and this led him to construct his celebrated leaf hive, which must be regarded as the next decided advance toward the introduction of a movable comb hive. Still it was with him only the *beau idéal* of an experimenting or observing hive, and as such he employed it. Morlot subsequently modified the leaf hive in some respects, adapting it better for practical use; and enthusiastically urged its general adoption in bee culture. He saw very clearly the importance of having command of the combs and control of the bees. But his modification came short of enabling him to attain his object. The inherent defects of this improved hive, and the consequent inconveniences attending the use of it, prevented it from finding favor, even temporarily, with any but a small number of

amateur beekeepers. "Not the least practical benefit resulted from the improvement," says a highly competent critic, when incidentally adverting to Morlot's hive.

Next in order came Jähne's annular hive, composed of a series of hoops or rings, one inch in breadth, and ten inches in diameter, set half an inch apart in a triangular frame, and enclosed within two semi-cylinders of wood or straw. This device was found to present no advantage over the preceding, and its sanguine inventor failed to write it into favor. The Russian or Propokovitsch hive was invented at about the same period (1841.)



Propokovitsch Hive.

This was a further attempt to employ movable frames, so that each might be taken out or inserted at pleasure. The frames were placed side by side, with a small space between them, thus admitting of a horizontal motion when shoved in or drawn out. The hive had three compartments or stories, each of which contained a set of frames; but the important feature, "the leading principle" of the contrivance, consisted "in the capacity of the hive to be reversed or turned upside down"—an operation which was alleged to "lead to the most important results in the management of bees." In populous colonies, however, it was found that the filled frames could not be drawn out without crushing great numbers of bees, and so irritating the rest as to render them unmanageable. The difficulty was still greater when the bees cemented the frames to the top and sides of the hive with propolis, as they almost invariably did. None

but experienced apiarians, like its inventor, could work the hive, and it fell into deserved discredit.

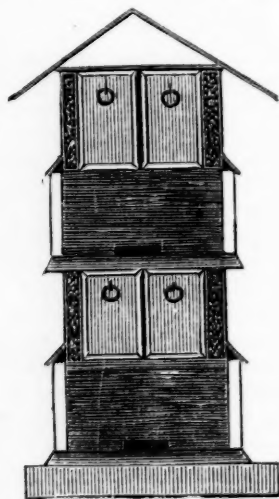
The next invention, and that which alone received general approval and acceptance in Europe, was Dzierzon's movable bar hive, first publicly announced in 1845, but long previously in use, and fully tested in the inventor's own apiaries. In its original form it was a simple oblong box, thirty inches long, nine inches broad, and fifteen inches high, the ends being movable battened doors. Two corresponding grooves were cut in the inner sides, half an inch from the top, in which were placed, at intervals of half an inch apart, a series of cross bars or slats fitted up with pieces of empty comb, as guides for the bees. The entrance was on one of the sides, midway of its length, and one inch from the bottom. In building or extending the combs, the bees attach them to the sides of the hive. These attachments have to be severed when the bars and combs are to be taken out. As the ends of the bars are confined by and can only slide in the grooves, the combs must be taken out consecutively, and an interior comb can be reached only by removing all the anterior ones. With his hive substantially thus constructed, though with various modifications, that celebrated apiarian made all his observations and discoveries; and he still operates with it exclusively in his extensive apiaries. Its chief defects are that it requires the lateral attachments of the combs to be severed before removal, and that the bars can only be taken out consecutively. Dzierzon himself does not regard these as defects or objections. By long practice, he has become so expert in his processes, and so habituated to the use of his hive, that he is not willing to con-

cede that a change in these respects would be an improvement. The preceding cut presents a view of the exterior of his hives, as he arranges them under cover, in three tiers of two each, placed back to back.

By a more recent modification, or the introduction of what he calls *double* or *twin* hives, he effects a saving of material, facilitates the multiplication of colonies, and secures for his bees greater protection against the severity of winter. These he regards as, for practical purposes, the best form of hive yet introduced in Europe.

Several years after this, M. Debeauvoys introduced a hive in France, which may be regarded as a further advance in the right direction; but as still falling short of supplying the desideratum sought. It is inconvenient in form and complicated in structure. Separate frames, it is true, are provided for the combs, but they are awkwardly shaped, difficult to be inserted or removed, and can only be taken out consecutively like the bars of Dzierzon's hive. M. Debeauvoys had undoubtedly a dim conception of the value of a movable comb hive, but he failed to devise one that could be advantageously used. His hive was an *approximation* to what was wanted, and that is all that can be claimed for it on the score of merit.

This was the stage of improvement which had been attained in Europe, when the Rev. Mr. Langstroth invented and introduced his movable comb



Stack of Dzierzon Hives.

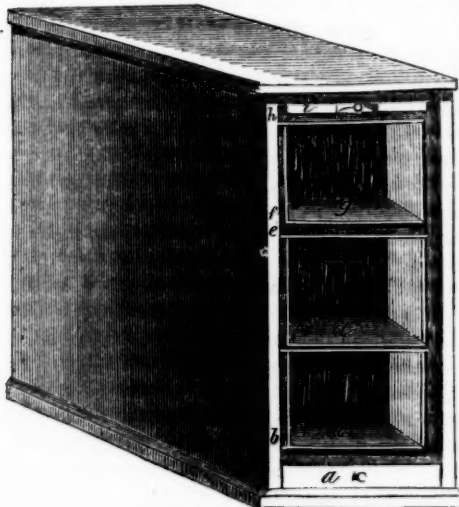


One-story Ornamented Double Glass Hive—rear view.

hive in this country. This hive, in its ordinary form, is of the most simple construction; and, together with the frames, may easily be made by any one accustomed to use carpenters' tools. It can be made of any size or form which experience or experiment shows to be advantageous. It is opened from above, and any frame may be removed or replaced at pleasure, so that the beekeeper has perfect control of the combs and the

bees. The mode of managing it and performing with it any operation required, can be learned without difficulty. Nor is there any conceivable advance or improvement in bee culture, to which it is not completely adapted.

One of the defects of the Dzierzon hive—the impossibility of removing the combs without severing the side attachment—was so obvious, that a remedy was early sought, and in 1855, the Baron of Berlepsch adopted frames similar in principle, though slightly differing in construction from those of the Langstroth hive. These enabled him to remove the combs without cutting, and with ease. But his frames are troublesome to make and costly besides—two objections which operate against their introduction into use. An expensive hive, however good it be, is an article of luxury in which common beekeepers are not



Berlepsch Hive—rear view.

much disposed to indulge. Moreover, though the Baron's frames facilitate the removal of combs, the necessity of removing them in succession, to get out the hinder or any intermediate one, remains as before, and must ever constitute a serious objection to that form of hive. In Germany, where land is dear and timber scarce, the system of piling hives on and against each other was adopted, and is adhered to from the necessity of the case. But in this country, where matters are totally different in these respects, we can afford and may well prefer to place our hives separately, so as to have them and their contents conveniently accessible from every quarter.

As we shall have occasion hereafter to advert to several of these hives, we content ourselves for the present with thus noticing them in their chronological order.

GREEN HONEY.

Several years ago Dr. Küchenmeister found some green honey in a hive at Seerakowa. The owner of the hive, an intelligent beekeeper, was of the opinion that the honey was from the juice of grapes, which the bees had gathered plentifully in the preceding autumn. Though the source of the honey was thus surmised, and its peculiar color was attributed to the bluish-green bloom with which the grapes were dusted, it was subsequently admitted that the true cause of the color was not satisfactorily ascertained.

In the fall of 1859, I had an opportunity to observe bees foraging on the Early Burgundy grape, and likewise on plums and prunes, which had been gathered and brought to my house. It was difficult to keep the bees away from the baskets, and they were ever ready to alight even on the fruit which I held in my hand. Yet I could not discover that the honey they were storing up in their cells, had a green tinge; and the conjecture of Dr. Küchenmeister received no support from my observations at the time. But subsequently, when I removed the combs containing that honey, and noticed that that which flowed from the ruptured cells was of a *beautiful green color*, I changed my opinion. As the two occurrences thus observed were attended by similar circumstances, and the results were similar, we have reason to believe that the peculiar color of the honey has been traced to its true source. Still, as the juices of the fruits named do not, when ripe, exhibit a green tint, it may perhaps be fairly inferred that the color originates from the bloom licked up or mixed by the bees with the saccharine juices they gather from the bruised or ruptured fruits.

H. H. K.

There are three German adages which run thus:

1.

Bees, sheep, and angle-rod, be sure,
Will make thee quickly rich—or poor!

2.

Sheep, doves, and bees, (nought surer,)
Will make thee nor richer nor poorer!

3.

Keep plenty of bees and sheep,
Then cosily lie down and sleep!

In the kingdom of Bavaria, over 200,000 hives of bees are kept, according to the official returns made to the government; and these, it is stated, yield an average annual profit of 75 per cent. on the investment. In view of this result, a late German writer thinks there is rather more truth in the last of these adages than in the first two.

The Italian Bee.

BY THE REV. GEORGE KLEINE.

No occurrence subsequent to the publication of Dzierzon's "*Theory and Practice of Bee Culture*," has produced so great a sensation or elicited such general interest among beekeepers, as the introduction of the Italian bee into Germany. The stranger has been welcomed by one class, with the utmost enthusiasm, as an important acquisition; and regarded by another with distrust, because its ability to endure a more rigorous climate, was yet unascertained. Even now, opinions respecting its value differ so widely, that it is difficult for an inquirer who examines the various statements, to arrive at a satisfactory conclusion. It will therefore, probably, be gratifying to those to whom the whole subject is new, to have placed before them the results of the experience of various apiarians who have been engaged in the culture of this variety of the honey bee. I purpose doing this in the present and some subsequent articles, and shall endeavor to treat the subject with entire candor.

The so-called Italian bee has been cultivated from time immemorial in the northern portions of Italy, and some adjoining districts, and differs from the common honey-bee only by its peculiar color and markings. In the workers the first three upper segments of the abdomen are of a bright orange color, though the lower margin of the third segment is black. While young, this coloring is brighter, and becomes darker as they increase in age; but under all circumstances it remains sufficiently marked to enable the observer to distinguish the two kinds at a glance. Still more conspicuous is the difference between the Italian and the common queen. The Italian queen has not only the orange color segments in common with the workers, but the yellow predominates, also, in all the other segments. The drones differ from the common drones, in having the first three segments bordered with orange, and in having orange-colored spots besides.

Dzierzon, as he states, was "greatly surprised by the unusual appearance presented by the Italian bees, not having anticipated so marked a difference in color. Each worker, also, when gorged with honey, seemed to be swollen to the dimensions of a queen." All who see the Italian bee for the first time, are, like Dzierzon, agreeably surprised; so unusual and singular is their appearance.

Still, notwithstanding these striking peculiarities, the Italian bee is not a distinct race, but

simply a variety of the common honey bee, corresponding with it in all respects, except color and markings. Many have, indeed, contended that they differ from the common kind in various points. But such is not the fact. The Baron of Berlepsch gives the following, as the result of his observations:

"It is nothing more than a differently colored variety of our well-known common *apis mellifica*. In this opinion I am supported by two of the highest authorities, Professors Von Siebold and Leukart. I am, indeed, curious to learn in what, besides color and marking, the least difference of physical structure can be found. Some say the Italian worker is larger, and others say it is smaller and more slender. Some say the Italian drones are larger than the common; and Heaven knows what specific differences they discover between the queens. Delusion all. Variations and differences, quite as great and striking, can be found among our common bees. Thus we frequently notice small drones, diminutive workers, and Liliputian queens—diversities resulting, as is well known, from the size of the cells in which these are respectively bred. And who has not observed how greatly the bees of common colonies differ in size, even in the same apiary! The Italian bee, as compared with the common kind, is not a different species, but merely a variety of the same species—a race, a breed; just as the Arabian and the Polish horses, the Durham and the Holstein cattle, are not different species, but varieties of the same species. As in these, the varieties, the races, the breeds, differ from each other, not only in physical conformation and color, but likewise in peculiar habits and properties; as the Arabian steed has more speed and bottom than the London cart-cob, and as the Ayrshire cow yields more and richer milk than the Tyrolese, so also are there differences between the Italian and the common bee—peculiarities of color, adaptations of habit, and manifestations of instinct, specially characteristic of each, and which give the one preferences in some respects over the other."

Dzierzon also distinctly recognizes this identity of species. Soon after receiving his original colony from Italy, he remarked:

"The size of the cells built by them, as well as of the bees themselves, is precisely the same as in the case of our common bees. The Italian bee would be of less value, and less interesting to us, if she were of a distinct species, sustaining to the common kind some such relation as subsists between the latter and the humble bee. But she is clearly of the same species, differing only in color and

some few other obvious particulars. Hence as the Italian and the German bees will peaceably unite in one colony, and the German bees will accept of an Italian queen, as the Italians will of a German; and as they will also mutually accept and cherish each other's brood, they furnish us with the means of making various interesting experiments and observations. The Italian bee is only our ordinary *apis mellifica*, distinguished by certain prominent characteristics peculiar to herself. If this were not so, it were idle to think of interchanging queens or brood, and useless to furnish them with empty comb, from our common stocks.—The two kinds do not differ in any essential particular, they will unite cordially in one community, and accept reciprocally combs and brood, royal cells and queens; though when thoroughly intermingled in the same hive, they may, during life, be as readily distinguished from each other, as white men from black."

As early as the time of Aristotle, the existence of the two races was known; and Virgil clearly describes the difference between them in the fourth book of his *Georgics*. Varro and Columella also mention them. And at this day both varieties are met with in various parts of Italy. Mr. Deus, of Dusseldorf, found the orange-colored bees at Genoa, and the black in Nizza. Spinola found both kinds in Piedmont, though the common bee was less frequent there than the pure Italian. The reddish or roseate bee, mentioned by Della Rocca, which is said to have been introduced into France from Belgium and Holland, is probably the Egyptian variety, described by Latreille as the *apis fasciata*.

Though the Italian bee was so long and extensively known, it escaped the notice of the German apiarians, who little anticipated how important she would prove to be for the settlement of controversies which had long been maintained among them. Capt. Baldenstein, of Cour, in the Grisons, first called attention to this bee in 1848, as peculiarly adapted to determine the question as to the origin of drone-eggs, and as furthermore of great value in practical bee culture. During his long sojourn in Italy, he had enjoyed ample opportunities to observe the habits of these bees, and subsequently introduced them into Switzerland. Though he did not succeed in multiplying pure stock, he obtained some important results, an account of which he communicated to the *Bienenzeitung*, and these attracted to it the attention of the intelligent correspondents of that periodical.

Dzierzon, who, in whatever tends to elucidate the theory or advance the practice of bee culture, is ever foremost, took the lead here, also. His

fame as an apiarian had already extended beyond the Alps, and induced Madame de Prollius, of Mira, near Venice, to address some inquiries to him, in the autumn of 1852. When replying, he availed himself of the opportunity to request his fair correspondent to send him a hive of Italian bees, hoping thus to obtain what he so ardently desired to possess. His request was promptly complied with, and by the aid of the Central Bureau of Agriculture, at Vienna, the hive was transmitted from Mira, and reached him safely on the 19th of February, 1853.

Thus the means, long desired by the German apiarians, of definitely settling various disputed points, were happily placed in the hands of their most distinguished co-laborer, who was likewise eminently qualified to employ them properly.

But the first problem to be solved was, whether the Italian bees could be preserved pure in their new home. If this were not practicable, then the introduction of them would lead to no permanently valuable results, and well might it be held a matter of doubt at least, since Capt. Baldenstein had not succeeded in multiplying genuine stock, by any means he could devise. But Dzierzon did not despair, declaring that unless some special mishap should befall his colony, he felt confident of attaining his object, as he intended to adopt a process essentially different from that pursued by Capt. Baldenstein. The meeting of the General Apiarian Convention, at Vienna, in the ensuing autumn, was now looked forward to with great interest, as Dzierzon promised to report to it his success or failure, with an account of his observations meantime, and the results of the experiments he designed to make. When the Convention met, he stated that he had succeeded in rearing thirty Italian queens, fecundated by Italian drones, and consequently pure. Besides these he had twenty young Italian queens fecundated by common drones, and four common queens fecundated by Italian drones—which of course were mongrel brood. His eminent success after the failure of Capt. Baldenstein, was highly gratifying and encouraging; yet it did not remove all doubt respecting the perpetuation of the race in its purity in a foreign climate. It was possible that for a few generations it might remain essentially unchanged, and yet, in process of time, gradually so degenerate as not only to lose its more prominent characteristics, but also the other properties which gave it a superiority over common bees. Though Capt. Baldenstein stated that, after seven years' experience, he could perceive no tendency to degeneration from the influence of climate, pasturage, &c.; this was not regarded as conclusive,

because the effects of climate would be likely to manifest themselves only among the more remote descendants of the colony, though the brood continuously produced by the original queen, would exhibit no symptoms of change. The Baron of Berlepsch says:—"Almost every one to whom I showed the Italian bees in my apiary, inquired whether they would not degenerate in our cold and variable climate," and adds—"they should not have asked me, for I had addressed the same question to Dzierzon."

The subject engaged the anxious attention of Dzierzon, who subsequently adverted to it thus:—"Several apiarian friends who obtained Italian queens from me, conceive they have noticed that there is, in our climate, a tendency in the race to degenerate, because they occasionally observed workers and young queens emerge which are less beautifully marked than usual. The fact stated is undoubtedly correct, but the inference drawn from it is erroneous. The Italian race, properly managed, does not degenerate, but even admits of improvement. It evidently, in its purest state, contains a slight dash of common blood, introduced in the long course of ages; since no Chinese wall—not even the Alps—could effectually isolate the races and keep them from intermixing to some extent. Now, this fragmental dash of foreign blood, exhibits itself only in the occasional production of individuals, especially queens, not having the fulness and clearness of color which distinguishes the genuine breed. It can therefore the more easily be *bred out*, by a careful selection of stock. It is my practice always to select and reserve only the most perfectly marked queens and drones, believing that I shall thus in the course of time, obtain a considerably improved breed." The Baron of Berlepsch, adopted the same view of the case, and says:—"I shall constantly endeavor to preserve and breed from the finest, that is, the more brightly orange-colored drones, and incontinently destroy every queen that does not emerge full colored and thoroughly marked." Improvement may be difficult to accomplish, yet it is not impossible.

But that the Italian bee is of a constant race and fixed type, independent of climate, is evident from what Dzierzon says of it, after attentively observing it for four years.—"This race of bees," he says, "is still as beautiful, as industrious, and as docile, as it was in the first season. Nay, in several of my colonies, as the result of careful breeding, it is even handsomer; because all the workers have now precisely the same color and markings. The queens, are, for the most part also brighter colored than the one I procured from Italy, as I in-

variably use the brood of the handsomest and most fertile queens for multiplying." The experience likewise of all the other apiarians in Germany, who labored for the diffusion of the new variety, and bred stock with due care, corroborates Dzierzon's statement. But the most conclusive evidence is the perpetuation of the pure race in those countries where it has subsisted from time immemorial, side by side with the common bee—as in northern Italy, in Normandy and in Flanders.

A deterioration of the race could only result from so-called bastardizing. The term *bastard*, as applied to the progeny of common and Italian bees, is sadly inappropriate, and cannot justly be applied in this case, in the sense in which it is used, of the mongrel progeny of other animals. The expression, however, was unfortunately introduced by Capt. Balenstein, and thus brought into general use. It may as well now be retained, for apiarians who, as Dzierzon remarks, restrict their speculations to bee culture exclusively, may be permitted to regard as important enough to convert for them, as it were, a race or variety into a distinct species, differences which the scientific naturalist looks upon as of no real significance.

But the variation or degeneration resulting from bastardizing, is attended with peculiar and perplexing phenomena. At Vienna, Dzierzon first called attention to the fact that the bastard queens produce a progeny which is half Italian, not in *kind*, but in *number*. Thus in both kinds of bastard colonies, with common as well as Italian queens, bees seemingly pure Italians are produced, side by side with others apparently common, whilst only a portion are clearly a mixed or mongrel breed. Then likewise it occasionally occurs that a pure Italian queen fecundated by a common drone, produces brood predominantly of the one variety or of the other; and in some instances, the earliest produced progeny will be colored, and subsequently all will be common bees. From these and similar phenomena, strange and contradictory conclusions were deduced. Thus Mr. Rothe reared some Italian queens, which must have been fecundated by common drones, as his Italian queen perished before she laid drone-eggs. Several of these queens, he alleges, produced in the fall and spring following, Italian workers exclusively, though not all of equal beauty. Thence he considered himself authorized to designate as delusive, Dzierzon's assumption that a queen is genuine, whose progeny consists of Italian bees exclusively, while one which produces indiscriminately common and Italian bees, must be regarded as bastardized. He was further led by his observations, to the erroneous conclu-

sion that fecundation by a common drone did not necessarily bastardize every queen reared from pure Italian brood.

The Baron of Berlepsch expresses himself with more clearness on this topic. "The Italian race as we now have it," says he, "is not *constant* in color, and German perseverance and ingenuity are needed, to bring out fully and fix permanently its proper characteristic markings. Nay, I might even venture to assert that the Italian bee is not yet a perfectly distinct and peculiar race, but requires to be made such by a course of careful breeding, by which the dash of common blood shall be separated and excluded. An original queen, bred and fecundated in Italy, produced occasionally less highly-colored workers, and queens of a darker yellow, nay, some scarcely distinguishable from the common kind. Such also was the case with some of mine. Queens emerged, brilliant as, though formed of beaten gold; and others again nearly as black as ravens, darker than common queens usually are; but the greater number were of an intermediate cast. The bright yellow queens produced, if not at first, yet ultimately, Italian workers exclusively. If at first a few common workers emerged, still after three or four weeks, or at latest in the ensuing spring, Italian bees alone appeared. The dark queens almost invariably produced common workers only, the orange-colored were very rare, and a few had only a faint tinge of yellow. Those queens which, from their color, held an intermediate rank, generally produced yellow bees and common ones indiscriminately. Occasionally one which, in external appearance, approximated to the Italian markings, would produce, from the first, Italian bees exclusively. The dark and all the less brightly colored queens produced bastard brood, without exception, even in seasons when none but Italian drones were hatched. Whereas the brighter colored, fecundated in summer, when common drones abounded, sooner or later produced Italian workers only. Sometimes also splendid specimens of queens appeared whose eggs always produced pure Italian workers; and, what is of more importance, genuine Italian queens."

The cause of the phenomena referred to, is to be sought for in the fact that some of the queens were genuine and some bastard; and that in the latter, the common blood was predominant—in some to a greater, in others to a less extent.

Count Stosch had previously made similar observations, and came to the conclusion that *only those queens should be considered genuine, whose royal progeny produced none but Italian brood.* Dzierzon

also gives it as the only reliable criterion of the genuineness of a queen, that her royal daughters, fecundated by an Italian drone, produce Italian workers exclusively. All good apiarists engaged in rearing Italian bees, now concur in this view, and thereon is based the only sure practical mode of perpetuating the pure race.

Thus the certain preservation of the Italian race in its purity, is certainly feasible, if the requisite arrangements and precautions be adopted and adhered to strictly and perseveringly. Dzierzon says:—"Though an Italian colony with an unfecundated queen, stand amid hundreds of common stocks, our object will be attained if we suppress drone-breeding in the latter, and foster it to the utmost in the former." His own original Italian hive was placed among seventy hives of common bees, yet the majority of the Italian queens reared by him were fecundated by Italian drones. He managed to procure so large a supply of Italian drones as greatly to outnumber the others, by transferring the drone-combs filled with brood from his Italian stock to the common hives, and replacing them with empty drone-comb taken from these. Among other means of preventing degeneration, he recommends so arranging matters that the bees of hives containing unfecundated queens several days old, and those of others containing the most Italian drones, should be induced to fly simultaneously, either in some isolated location, or at a particular hour or season when common drones are not flying. This is not difficult to accomplish, as the Italian bees commence breeding much earlier in the year, and consequently are sooner provided with drones, than the common kind. Hence, if young Italian queens are reared as soon as drone larvae can be found in Italian hives, intermixture will be almost certainly precluded, if the weather permit the queens and drones to fly before drones are hatched in common hives. The preservation of Italian drones to a period beyond that at which common drones are destroyed, may be effected by removing the queens from some of the Italian stocks which still have drones. By successive removals of the young queens reared by such colonies, the retention of the drones till late in the fall may be secured, for the fecundation of queens reared after the disappearance of the common drones.

The ill success of Capt. Balenstein in his efforts to multiply Italian bees, is accounted for by Dzierzon, on the supposition that the original hives contained only a small quantity of drone-combs, and consequently produced proportionately few drones. If this had not been so, he

thinks the young Italian queens would certainly have been fecundated by Italian drones, as these bees swarm much earlier in the spring than our common kind.

RANGE OF BEES' FLIGHT.

The distance to which bees will fly in search of pasturage and to gather honey, has been the subject of much discussion and controversy. I regard it as depending so much on circumstances, that it is rather a matter for observation in each particular locality, than one to which any general rule can be applicable. I conceive it to be the province of each apiarian to study his own location, and to be governed by the circumstances by which he finds himself surrounded. Seasons, climate, the character of the prevalent vegetation, the nature of the cultivated crops, their customary rotation, &c., must all be taken into consideration, as they exert a controlling influence on the resources which the bees can command. As these vary, so also must vary the abundance or scarcity of the pasturage resulting therefrom, and the range of the bees' flight in quest of their coveted treasures must necessarily be influenced and determined thereby.—When distant points present no superior attraction, the bees will certainly not fly far. But when the immediate vicinage withholds what more distant areas offer, their excursions take a wider range, and extend very far. These diversities vary with the varying season; are affected by the prevalent course of the wind; and are influenced by the kind of crop under cultivation. They are governed too by the situation of the locality in which bee culture is prosecuted. On an extensive level plain or prairie, of uniform climate and uniform vegetation, bees do not usually fly far; and there it does not unfrequently happen that they fail to secure the requisite supplies of honey; because, when the ordinary fountains of nectar are dried up, the failure is universal in the entire area to which they have access. In such case, the monotonous character of the vegetation all around necessarily renders failure and famine synonymous, so far as the bees are concerned. A fertile valley with its adjacent hills presents a more happy combination, and the bees' flight is less limited—extending sometimes to the distance of three or four miles. The earlier-blooming flowers in the bosom of the valley, and the later supplies furnished by the flora of the hillsides, give to bees there located a decided advantage. Short crops or failures are rare in such situations, because a succession of pasturage is offered to the busy gatherers, and provides them with constant employment from spring till fall.

Unfavorable weather never cuts off their resources so entirely as to prevent them from providing adequate stores, even in the worst years. But it must not be forgotten that very distant sources of supply, such as are situated two or three miles from the apiary, are never of much account, however ample in themselves, as much time is lost in passing to and fro, and many perish on the journey. Hence it is customary, in many parts of Europe, for the beekeepers to perform a sort of Mahometan miracle in behalf of their cherished charge, and as the pasturage cannot come to the bees, they carry the bees to the pasturage—by transporting their hives thither. S. S.

BEES AND BOTANY.

Each species of the genus *Apis* appears to have some special classes of forage plants assigned to it for use, by the Creator. The blossom of the red clover and the flowers of bonévale (*Symphytum officinale*) abound in honey inaccessible to the common bee, but easily reached and appropriated by the humble-bee, which is, in its turn, unable to gather from the smaller kinds of flowers. The case is similar with the tobacco plant, the purple lamium, the dead nettle, etcetera, which have all been designated by botanists as honey plants. They are visited by the humble bees only, and not by the common bees. The same is the case likewise with the asters, the lupines, the vetches, the peas, and the beans.

Bees generally prefer gathering from the blossoms of one kind of trees or plants exclusively, when several kinds are simultaneously in blossom. Thus, all other flowers are forsaken for those of the lindens while these are in bloom; and those of the locust tree constitute a universal attraction, to the exclusion and neglect of all others. They will forsake their favorite rape, if buckwheat be in blossom at the same time. The crown imperial secretes honey abundantly at the base of the petals, yet I have never seen a bee gathering therefrom. Whether this be from an aversion to the odor of the plant, or some distasteful quality of its secretions, or because some other more attractive flowers blooming at the same time, invite and engage their labors, I have not yet been able to ascertain. A.

LONGEVITY OF THE QUEEN BEE.

Queen Bees usually die in their fourth year, though they have been known to live longer.—There is, therefore, very great advantage in hives which allow her, when she has passed the period of her greatest fertility, to be easily removed. See our article on Hives in this number.

MEXICAN AND OTHER BEES.

Various kinds of bees are found in Mexico, but they are either *melliponæ* or *trigonæ*, and not *apis mellifica*, such as are common in this country. A wild bee exists in the districts of Jalisco and Durango, which produces a well-flavored and ruby-colored honey, gathered exclusively from Cactus flowers. Another kind is found in Yucatan, which produces an abundance of yellow wax. In Venezuela and Guiana there is a species of bee called *apis amalthæa*, which stores up in small waxen sacs or bags attached to the top branches of trees, a high-flavored, very liquid honey, requiring to be boiled down to a proper consistency before using. The wax, which is yielded very plentifully, is of a brownish-yellow color, and cannot be bleached.

There are also in Mexico, several kinds of stingless bees, which are favorite family pets in the districts where they occur. When the people find any of them in the forest, the tree is speedily felled, and that portion in which the bees harbor is cut off, carried home, and suspended against the front of the fortunate finder's dwelling. A peculiarity in the habits of these bees, is their mode of securing the honey they gather. They deposit it not in ordinary cells, but in sacs made of wax, which are of the size of a pullet's egg, and are attached by them to the inner sides and top of the hive or *gum*. In the spring and fall, the proprietor takes out these little sacs, and empties them into bottles or bladders. The honey is very pure and of an excellent quality.

The chief pasturage for bees in the neighborhood of Vera Cruz and Puebla, is supplied by the various species of *Salora* and *Sygenesia*, which there grow wild and bloom in what are with us, the winter months. At that season the dews are heavy, and as no rain falls then, the bees can labor with uninterrupted industry. The rainy season (in July,) is the most trying time for these insects, as there are few flowers in blossom then, and the nectar of those which do bloom is washed out by the frequent heavy showers. The bees then resort to the gardens and the sugar plantations, which latter prove fatal to multitudes that perish in the syrup vessels. In September the bees are generally subject to dysentery, which is, singularly enough, supposed to be caused by the blossoms of maize or Indian corn.—SARTORIUS.

Dr. Jähne says he has occasionally noticed bees lick up the liquid extruded by the aphides, but more generally saw them pass it with evident unconcern.

The Persian Insect Powder has been successfully used to expel ants from hives and apiaries.

BEES NOT DECEYED.

It always seemed strange to me that bees were never found in the vials partially filled with sweetened water, which I suspended on my espaliers, to catch wasps and other insects. I examined more than twenty of such vials, very carefully, yet never detected a bee among the multitude of dead wasps, hornets and flies which they contained. I could account for their absence only by supposing that the wasps and flies are the first to discover these receptacles of alluring liquid; and when the bees arrive, the vials already contain a contingent of captured adventurers belonging to those tribes with which the more chary bee is not disposed to join company. The peculiar odor, also, emanating from the entrapped and perishing victims, though attractive to those of their own order, is probably repulsive to the bees, and deters them from entering the fatal vessel. H. H. K.

THE BEES AS MATHEMATICIANS.

Mr. Willich recently read to the British Association a communication on the above subject, which he illustrated with models admirably calculated to make the matter intelligible; and related a very interesting history of the speculations of mathematicians, in their successive attempts to discover the angle which gave the greatest strength with the greatest economy of materials. It proved that though some of the mathematicians had fallen into error, the bees, by a peculiar instinct, had always used mathematically correct angles.

MR. HOFFMAN, of Vienna, caused a very prolific queen bee to sting him, allowing her to withdraw her sting leisurely. He states that she laid no eggs thereafter, though she seemed to be in good health and vigorous during the five following weeks. He then killed and dissected her, but could not find any evidence that she had sustained internal injury. Probably some muscle connected with her oviduct was deranged by her exertions in withdrawing the sting.

The earliest resources of the bee are the willow, the osier, the poplar, the sycamore, and the plane, all of which are very important adjuncts to the neighborhood of an apiary. The catkins of several of them afford an abundant supply of farina and attract the bees very strongly in early spring when the weather is fine. Mr. Kirby, in his *Monographia Apum Angliæ*, considers the female catkins of the different species of *Salix* as affording honey, the male ones, pollen.

To these may be added the snowdrop, the crocus, white allyssum, laurustinus, &c.

Dr. Barth's Method.

The following is the method of managing bees in common hives, whether of wood or straw, devised and recommended by Dr. Barth, Editor of the German *Bienenzeitung*, and practised by himself and others with satisfactory results. It is still extensively employed in districts where movable comb hives have not yet been introduced.

The beekeeper should select two healthy populous stocks, in hives having each a hole three inches square cut in the top and covered with a close fitting board or block. When the first hive, or No. 1, sends out a swarm, it is immediately to be removed to some other location in the apiary; and the hive containing the swarm must be set on the place it had occupied. Many of the old bees will, for several days after the removal, leave the parent hive and join the swarm, strengthening it, and divesting the old stock of all disposition to swarm a second time.

After the second or No. 2, of the selected stocks has also swarmed, it is immediately removed and placed on the top of No. 1, first taking away the block or board which closes the hole. The hive containing the swarm is then to be set where the parent hive stood.

If the two hives selected are of nearly the same size the supering can be effected with but little trouble. But if No. 2 is larger than No. 1, a half inch board of suitable dimensions and having a hole cut in it corresponding with that in the top of No. 1, and adjusted to it, must be interposed between the two hives. The entrance of the upper hive must now be carefully closed, constraining the bees to pass down through No. 1, in their way out. Many of the bees in No. 2 will forsake it during the next two or three days, rejoining and strengthening the swarm which issued from it.

The first removed of the old stocks should have a spoonful of water given to it daily, for about a week after it has been removed from its old stand.

The owner will thus have two populous young colonies, and a very strong stock from the union of the two old ones.

If the season be ordinarily favorable, the young colonies will soon fill their hives with comb, and store up honey enough to serve them for the ensuing winter. The united stock will also do well, having the brood of both to strengthen it, and a vigorous young queen.

On the day after the union has been made, nearly all the drones will be expelled from these parent hives, and the bees will begin to labor with great industry—displaying unwonted activity. The united stocks are to remain undis-

turbed till late in October. Then, by gently tapping on the sides of the hives, the owner can ascertain in which of them the bees have taken up their winter quarters—the loudest humming being heard in that which contains the queen and the mass of the workers.

If they are in the lower hive, the upper or No. 2, must be removed, and the hole in the top of the lower one closed. If they are in the upper, then the lower hive or No. 1, must be taken away, and the upper or No. 2, set on the bottom board, and its entrance reopened. The removed hive contains all the surplus honey, with very few bees, which will soon leave it, on puffing in a little smoke. The other hive will usually prove to be a fine standard stock, in good condition for wintering.

By this method a moderate annual increase of stock and a fair amount of honey is secured—which is as much as can ordinarily be expected in average honey districts, where bees are kept in common hives.

The novice in beekeeping should impress it on his mind, that a rapid multiplication of stock and large crops of honey in the same season, are incompatible results. He must constantly have regard to this fact, whatever description of hive he selects, or whatever method he adopts in his practice, or he will be liable to mortifying disappointment.

Mr. DEMAREES relates that, on the second of June, 1854, two strong first swarms issued from hives in his apiary, and united as they came forth. He hived them in a large double hive. They remained therein three days, few bees passing in or out meantime, and no comb was built. On the fourth day the entire mass sallied out again, in regular swarming style, and was hived anew. They were now content, went to work industriously and prospered. Both queens had probably been retained during the idle term.

An extensive traveller, Mr. Koppelhoff, remarks:—"On close observation everywhere among the peasantry of the countries I visited, I uniformly found that small cottagers, who kept bees, were in the enjoyment of a greater amount of the comforts and conveniences of domestic life, than those who paid no attention to that industrious insect."

To avert the injurious effects of dampness or condensed moisture in common wooden hives, in winter, Christ recommends removing the top or cover in September, substituting a straw mat for it, and then laying the top or cover thereon.



AMERICAN BEE JOURNAL.

Philadelphia, January, 1861.

TO CORRESPONDENTS.

All who are interested in the subject of Bee Culture, are respectfully requested to contribute to our columns. Communications to insure insertion, should be sent in by the first of the month at the latest, and as much earlier as possible.

Address them to A. M. SPANGLER & Co., Publishers, "AMERICAN BEE JOURNAL," No. 25 North Sixth Street, Philadelphia.

SPECIAL NOTICE.

Will those who receive this number of the "Bee Journal," do us the favor to send us the names of any persons in their neighborhood who are interested in Bee Culture. We desire to secure the names of all such, and will esteem a compliance with this request a very special favor.

SUBSCRIPTION RATES.

We will mail the "Bee Journal" to Subscribers at the following rates:—

Single Copy,	- -	\$1.00	a year, in advance.
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We will furnish the "AMERICAN BEE JOURNAL" and the "FARMER AND GARDENER" for one year, together with a prepaid copy of either the "Year Book of the Farm and Garden," or of "Both Sides of the Grape Question," for ONE DOLLAR AND FIFTY CENTS.

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We are prepared to execute orders for Plain and Fancy Book and Job Printing, at short notice, in good style, and on reasonable terms. We give special attention to Catalogues, Pamphlets, &c. Those who desire good work, at low rates, are requested to call and examine specimens.

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A limited number of Advertisements will be admitted to the "Bee Journal." The rates will be moderate.

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Give the Name, Post Office, County and State in full. Write them so plainly that they can be read with ease.

In sending money we prefer gold. Gold dollars can be sent with safety, if fastened to the letter sheet, by having a small piece of paper glued or pasted over them.

The notes of all solvent banks will be taken for subscriptions.

TO EXCHANGES.

Will our Editorial brethren who receive this number of the "Bee Journal," do us the favor to notice its advent, and at the same time continue their exchanges with us? We shall take pleasure in reciprocating the favor in any way in our power.

DELAY.

This number of our "Journal" has not been issued as promptly as it should have been, from the fact that some delay was occasioned by a difficulty in procuring at the desired time, the type for printing it. That difficulty having been removed, we hope to have all future numbers ready on or before the first of the month.

"THE FARMER AND GARDENER."

As many persons to whom this number of the "AMERICAN BEE JOURNAL" will be sent, are interested in Agricultural and Horticultural pursuits, we would direct their attention to the "FARMER AND GARDENER," a first-class paper devoted specially to these subjects. This periodical has assumed a high position in the Agricultural world, and justly ranks with the first in size, appearance, and value of contents. We have stated elsewhere, that a copy of the "Bee Journal," a copy of the "Farmer and Gardener," and a copy of either the "Year Book of the Farm and Garden" or of "Both Sides of the Grape Question," will be sent for "One Dollar and Fifty Cents." We are justified in asserting that no other publications in the United States of similar value, are furnished at as low rates. The Premium Books are handsome publications of high standard reputation, and have deservedly attracted great attention. Specimen copies of the "Farmer and Gardener" furnished gratis.

CLUBS!—Persons desirous of forming Clubs are referred to second page of cover, for terms.

Monthly Management.


JANUARY.

At the approach of cold weather, the bees gradually cease to labor and retire within their hives, and when winter has fully set in, we find them densely crowded between their combs, in a state of almost entire inaction, yet not really torpid. The queen has long ceased to lay eggs, and the last of the brood will generally have emerged before the close of the year. Closely packed together to maintain the requisite degree of warmth, and exceedingly abstemious in the use of those stores which their provident summer toil enabled them to lay up, they patiently await the return of milder weather. They seem to have a presentiment, an instinctive feeling, of the approach of spring; and long before reviving vegetation indicates its advent, unmistakable manifestations in the interior of the hive, show that the colony is conscious of the coming genial change. Not unfrequently the queen begins to lay eggs already in January, though this is by no means a desirable occurrence, resulting commonly in detriment to the colony and damage to its owner. Such precocious brooding involves a consumption of stores which may be needed for the support of the colony in the event of protracted unfavorable weather occurring subsequently, and which could be more advantageously employed for the same purpose at a later period. The presence of brood in the combs, imposes on the bees a necessity to occupy permanently that part of the hive in which those combs happen to be; at least they will very reluctantly abandon the brood-combs if a spell of severe cold supervene. They may hence perish of hunger, though there be an abundance of honey in other parts of their dwelling, to which they cannot readily have access while the cold weather continues, without exposing the brood to destruction. In common hives, the existing exigency, in such cases, can rarely be discovered in time to enable the owner to succor the suffering colony; and, though as a general rule, the bees should not be disturbed at this season, yet where movable frames are used, relief can be given when there is reason to suppose that the bees are in such unfortunate predicament. The hive may be opened and combs with sealed honey transferred from the sides and placed in close proximity to the cluster; or sticks of sugar candy may be pushed down among the bees between the combs, and their wants thus supplied. Such operations, however, should not be undertaken, unless there be cause to suspect that they are necessary; or when a mild day enables it to be done as a precautionary measure. Indeed, if

such a day occur in mid-winter, the opportunity should be availed of, to examine especially the weaker stocks, and such as are not amply supplied with stores. Their wants may then be safely ascertained and easily provided for, so as to carry them successfully through the winter. Whatever supplies are given to them, should be placed in close proximity to the cluster or immediately above it, that they may be readily accessible in any state of the weather.

Besides a sufficiency of stores, adequate warmth is indispensable for the wintering of bees. Straw hives are ordinarily warm enough; but box hives, made of thin boards, need some additional protection if wintered on their summer stands, in the open air. A piece of old carpeting, placed on and around them, leaving the entrance free will generally suffice. Movable comb hives, as commonly made, are sufficiently warm; but they need and should have just sufficient upward ventilation to prevent the condensation of moisture, against the interior of the sides. More than this might cause a deficiency of moisture, and the bees would suffer for want of water.

Mice are prone to enter hives in winter, if the entrances are large enough to enable them to do so; these should, therefore, be diminished so as to allow only one or two bees to pass at a time. Cats likewise are an annoyance, to which bees should not be exposed. They should not be permitted to run upon or gambol between the hives. Nor should the direct rays of the sun be allowed to strike the entrances during the winter, when the bees ought to enjoy undisturbed repose. A slight temporary screen, easily removed on mild days, when the temperature permits the bees to fly, will prove highly serviceable—preserving the bees and preventing an inordinate consumption of honey. If a warm day tempt the bees to fly while the ground is covered with snow, a quantity of loose straw should be scattered on it in front of the hives to keep the bees from being blinded by the glare, and aid them in regaining their homes. If, in addition to this, the apiarian has taken the precaution to secure his hives from being stolen, he will have done all that can properly be required of him, during this month.

 When robbing-bees attack a weak colony having a fertile queen, it is advisable to remove it from its stand to a dark chamber or cellar. Set an empty hive in its place, strew therein a handful or two of the stems and leaves of wormwood, and rub the front of the hive and the bottom board therewith. The assailants will soon forsake the spot, and the colony may be replaced on its stand on the evening of the following day.